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Part XI

Environmental Protection Agency

Standards of Performance for New Stationary Sources; Glass Manufacturing Plants

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 60

[AD-FRL 1563-3]

Standards of Performance for New Stationary Sources; Glass Manufacturing Plants

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: Standards of performance for glass manufacturing plants were proposed in the **Federal Register** on June 15, 1979 (44 FR 34840). This action finalizes standards of performance for glass manufacturing plants. These standards implement the Clean Air Act and are based on the Administrator's determination that glass manufacturing plants cause, or contribute significantly to, air pollution which may reasonably be anticipated to endanger public health or welfare. The intended effect of these standards is to require all new, modified, and reconstructed glass manufacturing plants to use the best technological system of adequately demonstrated continuous emission reduction, taking into consideration costs, nonair quality health and environmental impacts, and energy requirements.

EFFECTIVE DATE: October 7, 1980. Under Section 307(b)(1) of the Clean Air Act, judicial review of these standards of performance is available *only* by the filing of a petition for review in the U.S. Court of Appeals for the District of Columbia Circuit within 60 days of today's publication of this rule. Under Section 307(b)(2) of the Clean Air Act, the requirements that are the subject of today's notice may not be challenged later in civil or criminal proceedings brought by EPA to enforce these requirements.

ADDRESSES: *Background Information Document.* The background information document for the promulgated standards is contained in the docket and may be obtained from the U.S. EPA library (MD-35), Research Triangle Park, North Carolina 27711, telephone number (919) 541-2777. Please refer to *Glass Manufacturing Plants—Background Information: Promulgated Standards of Performance* EPA-450/3-79-005b).

Docket. Docket No. OAQPS-79-2, containing all supporting information used by EPA in developing the standards, is available for public inspection and copying between 8:00 a.m. and 4:00 p.m., Monday through Friday, at EPA's Central Docket Section, West Tower Lobby, Gallery 1, Waterside Mall, 401 M Street SW., Washington, D.C. 20460. A reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Ms. Susan Wyatt, Standards Development Branch (MD-13), Emission Standards and Engineering Division, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, telephone (919) 541-5477.

SUPPLEMENTARY INFORMATION:

Summary of Standards

Standards of performance for glass maunufacturing plants were proposed in the **Federal Register** (44 FR 34840) on June 15, 1979. The promulgated standards deal collectively with four categories of glass manufacturing plants: container glass, pressed and blown glass, wool fiberglass, and flat glass.

The promulgated standards apply to glass melting furnaces within glass manufacturing plants with three exceptions: hand glass melting furnaces, glass melting furnaces designed to produce 4.55 megagrams or less of glass per day, and all-electric glass melting furnaces. No existing glass melting furnaces are covered unless they undergo modification or reconstruction as defined by the Clean Air Act and the General Provisions of 40 CFR Part 60. Glass manufacturing plants that change fuel from natural gas to fuel oil are exempt from consideration as a modification. Rebricking of glass melting furnaces is exempt from consideration as a reconstruction.

The promulgated standards of performance, as they apply to gas-fired glass melting furnaces for each of the glass manufacturing categories are as follows:

Promulgated Standards of Performance for Gas-Fired Glass Melting Furnaces

[g of particulate/kg of glass produced]

Glass category	Standard
Container glass	0.1
Pressed and blown glass:	
Borosilicate	0.5
Soda-lime and lead	0.1
Other-than borosilicate, soda-lime, and lead	0.25
Wool fiberglass	0.25
Flat glass	0.225

These standards are based on data that show the ability of each category of glass manufacturing furnace to achieve such a level of control through the use of systems of continuous emission reduction. In selecting, these standards, costs, nonair quality health and environmental impacts, and energy requirements were considered.

An increment 30 percent greater than the promulgated emission limits for natural gas-fired furnaces is allowed for fuel-oil fired glass melting furnaces and a proportionate increment is allowed for glass melting furnaces simultaneously firing natural gas and fuel oil. Both allowances apply to glass melting furnaces producing other than flat glass. The flat glass standard is based solely on emission tests conducted on a liquid-fired furnace while the other standards are based on emission tests conducted almost exclusively on gaseous-fired furnaces.

Summary of Environmental, Energy, and Economic Impacts

Environmental Impacts

The promulgated standards will reduce projected 1984 emissions from new uncontrolled glass melting furnaces from about 4,890 megagrams per year (Mg/yr) to about 570 Mg/yr. This is a reduction of about 89 percent of the uncontrolled emissions. Meeting a typical State Implementation Plan (SIP), however, will reduce emissions from new uncontrolled furnaces by about 3,150 Mg/yr. The promulgated standards will exceed the reduction achieved under a typical SIP by about 1,200 Mg/yr.

The promulgated standards are based on the use of electrostatic precipitators (ESPs) and fabric filters, which are dry control techniques; therefore, no water discharge will be generated and there will be no adverse water pollution impact.

The solid waste impact of the promulgated standards will be minimal. Less than 2 Mg of particulate will be collected for every 1,000 Mg of glass produced. In some cases, this material can be recycled, or it can be landfilled if recycling proves unattractive. The current solid waste disposal practice among most controlled plants surveyed is landfilling. Since landfill operations are subject to State regulation, this disposal method is not expected to have an adverse environmental impact. The additional solid material collected under the promulgated standards will not differ chemically from the material collected under a typical SIP regulation; therefore, any adverse impact from landfilling will be minimal. However, recycling of the solids has a distinctly positive environmental impact.

Energy Impacts

For model plants in the glass manufacturing industry, the energy consumption that will result from the promulgated standards including that required by a typical SIP regulation ranges from about 0.1 to 2 percent of the energy consumed to produce glass. The

energy required in excess of that required by a typical SIP regulation to control all new glass melting furnaces constructed by 1984 to the level of the promulgated standards will be about 9 gigajoules per year in the fifth year. This energy requirement is not considered significant in comparison to the energy used by the new glass melting furnaces. Thus, the promulgated standards will have a minimal impact on national energy consumption.

Economic Impacts

Compliance with the standards will result in annualized costs in the glass manufacturing industry of about $8.5 million by 1984. Cumulative capital costs of complying with the promulgated standards for the glass manufacturing industry as a whole will amount to about $28 million by 1984. The percent price increase for products from new plants necessary to offset costs of compliance with the promulgated standards will range from about 0.3 percent in the wool fiberglass category to about 1.8 percent in the container glass category. Industry-wide, the average price increase for products from new plants will amount to about 0.7 percent. These economic impacts are reasonable.

Public Participation

On July 20, 1977, a notice of intent to develop a rulemaking pertaining to glass manufacturing plants was published in the **Federal Register** (42 FR 37213). Prior to proposal of the standards, interested parties were advised by public notice in the **Federal Register** (43 FR 11259, March 17, 1978) of a meeting of the National Air Pollution Control Techniques Advisory Committee to discuss the glass manufacturing plant standards recommended for proposal. This meeting occurred on April 5–6, 1978. The meeting was open to the public and each attendee was given an opportunity to comment on the standards recommended for proposal. On June 14, 1979, the Administrator listed glass manufacturing plants (44 FR 34193) among the categories of stationary sources, which in the Administrator's judgment, cause or contribute significantly to air pollution, which may reasonably be anticipated to endanger public health or welfare. The proposed standards were published in the **Federal Register** on June 15, 1979 (44 FR 34840). Public comments were solicited at that time and, when requested, copies of the Background Information Document (BID), Volume I were distributed to interested parties. Interested parties were advised by public notice in the **Federal Register** of a public hearing to invite comments on the proposed standards. The public hearing was open to the public and each attendee was given an opportunity to comment on the proposed standards. The public comment period was originally scheduled to continue from June 15 to August 14, 1979, but was extended (44 FR 47778) to September 14, 1979, pursuant to comments made at the public hearing that delays in receiving copies of the Background Information Document, Volume I had been experienced.

Thirty-three comment letters were received and eleven interested parties testified at the public hearing concerning issues relative to the proposed standards of performance for glass manufacturing plants. These comments have been carefully considered and, where determined to be appropriate by the Administrator, changes have been made in the standards that were proposed.

Significant Comments and Changes to the Proposed Standards

Comments on the proposed standards were received from glass manufacturers, an *ad hoc* industry group, trade associations, State and Federal government offices, and an environmental group. A detailed discussion of these comments can be found in the Background Information Document, Volume II. The summary of comments and responses in the Background Information Document, Volume II, serves as the basis for the revisions which have been made to the standards between proposal and promulgation. The comments discussed in this preamble are the major comments and are summarily addressed. For complete responses to all submitted comments, refer to the Background Information Document, Volume II. The major comments have been combined into the following areas: Need for standards; emission control technology; modification, reconstruction, and other considerations; general issues; environmental impacts; economic impacts; energy impacts; test methods and monitoring; and clarifications.

Need for Standards

Several commenters questioned the need for standards of performance for the glass manufacturing industry. Standards of performance are promulgated under Section 111 of the Clean Air Act. Section 111(b)(1)(A) requires that the Administrator establish standards of performance for categories of new, modified, or reconstructed stationary sources which, in the Administrator's judgment, cause or contribute significantly to air pollution, which may reasonably be anticipated to endanger public health or welfare. The purpose of standards of performance is to prevent new air pollution problems from developing by requiring the application of the best technological system of continuous emission reduction, considering impacts, which the Administrator determines to be adequately demonstrated. The 1977 amendments to the Clean Air Act added the words, "in the Administrator's judgment," and the words, "may reasonably be anticipated," to the statutory test. The legislative history for these changes stresses two points: (1) the Act is preventative, and regulatory action should be taken to prevent harm before it occurs; and (2) standards should consider the cumulative impact of sources and not just the risk from a single class of sources.

The 1977 amendments to the Clean Air Act also required that the Administrator promulgate a priority list of source categories for which standards of performance are to be promulgated. The priority list, 40 CFR 60.16, was proposed in the **Federal Register** on August 31, 1978 (43 FR 38872). Glass manufacturing was ranked thirty-eighth on that list. On June 14, 1979, the Administrator listed glass manufacturing (44 FR 34193) among the categories of stationary sources which, in the Administrator's judgment, causes or contributes significantly to air pollution, which may be reasonably anticipated to endanger public health or welfare. Even though glass manufacturing had been included on the proposed priority list, it was listed among the significant stationary sources because the priority list had not been finalized. This was done so that the development of these standards could proceed without having to wait for the priority list to be finalized.

Commenters questioned basing the decision to add glass manufacturing to the list of significant source categories on the proposed priority list. The decision to add glass manufacturing to the list of significant source categories was not based on the proposed priority list. The fact that glass manufacturing was a source category that was on the proposed priority list only added weight to the Administrator's decision to add glass manufacturing to the list of significant source categories. The decision to add glass manufacturing to the list of significant source categories was based principally on the judgment that glass manufacturing plants are significant contributors of particulate matter emissions. In addition, factors

similar to those considered in developing the priority list ranking were considered in adding glass manufacturing to the list of significant source categories. These factors included the mobility and competitive nature of the industry and the extent to which such pollutant may reasonably be anticipated to endanger public health or welfare. Commenters also questioned these factors.

In adding glass manufacturing to the list of stationary source categories, the Administrator explained that new glass manufacturing operations could be located in States which have SIP particulate regulations less restrictive than SIP regulations of the State of New Jersey. Commenters questioned the glass manufacturing industry's ability to locate its plants in order to avoid stringent SIP regulations. Industry commenters explained that raw material, customer, and financial considerations were much more important in determining plant location than the stringency of a particular State's environmental regulatory scheme.

All of these factors need to be considered in deciding where to construct a new facility. What was meant to be emphasized was the relative flexibility that a glass manufacturer has in locating a new plant. Manufacturers who have the freedom to locate a new plant with only minor restrictions caused by raw material suppliers and product market are considered mobile. Glass manufacturing plants are not restricted to locating in a particular region of the country as would a coal mine or a stone quarry. For this industry, raw materials and glass products can be and are shipped across the country.

The glass industry, in its ability to be relatively mobile, could readily relocate in States with less stringent standards or compliance deadlines. This has in fact occurred in at least one State where, at a public hearing, a glass industry representative specifically suggested that his company would relocate and construct new plants in another State to avoid having to "spend multi-million dollars for air pollution control equipment." This was shown to be somewhat of a trend by the State involved when it was found that in the past five years in excess of 10 percent of the State's glass furnaces have been shutdown and no new ones constructed (docket entry OAQPS–77/1–IV–A–2). This is especially significant when one looks at the glass industry's nationwide production increases in the past several years. One purpose of these standards is to avoid situations in which industries could be lured to one State from another just by virtue of there being a less stringent regulation in effect.

Commenters suggested that particulate emissions from glass manufacturing plants do not contribute significantly to air pollution. These commenters explained that the estimated 1,473 Mg/yr of particulate emissions from glass manufacturing plants presented in the preamble for the proposed standards is small in comparison to the total quantity of nationwide particulate emissions.

Almost any industry by itself accounts for a small portion of the Nation's total emission. The 1,473 Mg/yr estimate of emissions reduced by the proposed standards was the quantity attributable to the proposed standards and neglected the emission reduction attributable to SIP regulations. The total emissions from new glass manufacturing plants reduced by controlling the particulates from these plants to the promulgated standards, including the emissions reduced by SIP regulation, is about 4,363 Mg/yr. The annual particulate emissions for the glass manufacturing industry in 1976 are estimated to be approximately 18,000 Mg. A comparison of the 1,473 Mg/yr estimate and the 4,363 Mg/yr estimate to the total quantity of nationwide particulate emissions is inappropriate. The suggested comparison is between emission reduction estimates and emission rate estimates. The reduction in emission rate for the promulgated standards represents approximately an 89 percent reduction in emission rate and is not atypical of emission reductions associated with other standards of performance established under Section 111.

The 1,473 Mg/yr estimate of emissions was not the only factor upon which it was decided to develop these standards. Other factors such as the areas in which the affected plants are to be located and the effects these plants will pose to the public health and welfare were taken into account. With regard to the public's health and welfare, the submicron size of most glass furnace-generated particulates, among other factors, is particularly important. Of special concern is the capability of these submicron particles to by-pass the body's respiratory filters and penetrate deeply into the lungs. In excess of 30 percent of the particles less than 1 micrometer in size that penetrate the pulmonary system are deposited there. These particulates also have fairly long lives in the atmosphere and can absorb toxic gases, thus leading to potentially severe synergistic effects when inhaled. The decision to regulate these emissions is based on interrelated factors that when considered collectively led the Administrator to list glass manufacturing plants as a significant source of air pollution.

Commenters suggested that particulate emissions from glass manufacturing plants do not contribute significantly to air pollution because Class I Prevention of Significant Deterioration (PSD) increments would not be exceeded. The fact that emissions from a single plant would be less than the Class I PSD increment does not show that the category should not be listed. First, the test is whether the category, not an individual plant, contributes significantly. Second, although a single plant might not exceed a Class I increment, it could contribute significantly to the total level of emissions in excess of the increment. Most importantly, the major purpose of Section 111 is to "prevent new air pollution problems" [*National Asphalt Pavement Association v. Train*, 539 F.2d 775, 783, (D.C. Circ., 1976)]. That is, standards established under Section 111 should prevent PSD increments from being threatened by requiring control of new sources. It is therefore, not necessary to show that individual sources in the category would violate an increment.

Based on the judgment that particulate air pollutants from glass melting furnaces contribute significantly to air pollution, which may be reasonably anticipated to endanger public health or welfare, the Administrator listed glass manufacturing plants as a category of sources for control. Comments, as discussed above, have not led the Administrator to change this decision.

Emission Control Technology

During the development of the proposed standards of performance for the glass manufacturing industry, information was received concerning the use of process modifications as a method of reducing particulate emission from the glass melting furnace. Commenters stated that during the development of the BID, Volume I, EPA did not perform a thorough investigation into the use of process modifications as a continuous emission reduction technique. These commenters were also of the opinion that process modifications are an effective method of emission control, and, therefore, should be considered as an alternative to add-on control devices which are the basis for these standards of performance.

The discussion of process modifications in the BID, Volume I, along with the materials used to develop that section indicates that the use of process modifications in the glass manufacturing industry was taken into consideration during the development of the proposed standards of performance. From the information received, it was apparent that process modifications are used rather extensively throughout the glass manufacturing industry. The types of process changes employed by industry, along with the possible benefits and potential problems associated with these techniques, were presented in the BID. It is clearly evident that many issues concerning these methods were left unresolved.

However, the lack of resolution of these issues was not due to EPA's failure to investigate this area of emission control but rather due to the fact that the information that was available indicated that emission reduction by process modifications is uncertain with respect to the effectiveness of the techniques. It is because of this uncertainty that the Administrator decided to base these standards of performance on add-on control devices of known and proven effectiveness.

Since the proposal of the standards of performance for the glass manufacturing industry, additional information has been made available concerning the use of process modifications. This information has indicated that progress is being made by several glass manufacturers in reducing emissions by the use of certain process modification techniques. However, these comments have not resolved the uncertainty in considering process modification.

Process modifications constitute a variety of techniques that some glass manufacturers use to increase production, to improve energy utilization and, in some cases, to reduce particulate emissions. However, the Administrator has found that particulate emission reduction by process modifications is uncertain; data indicate a range from no emission reduction to about 50 percent emission reduction and, in certain cases, greater than 50 percent emission reduction. In addition, the consequences of using process modifications are not fully understood. For example, process modifications can affect the quality of the glass product and may reduce the operating life of the glass melting furnace. Process modifications may be applied intermittently and, therefore, may result in non-continuous emission reduction. Thus, the Administrator has concluded that process modifications, as presently used by glass manufacturers, are not adequately demonstrated means of continuous emission reduction. The recommended standards would not preclude the use of process modifications by those glass manufacturers who develop this capability.

It should be pointed out that Section 111(j) of the Clean Air Act provides a means by which an industry source subject to new source performance standards can request the Administrator for one or more waivers from the requirements of Section 111 with respect to any pollutant to encourage the use of an innovative technological system of continuous emission reduction. The purpose of this Section of the Act is to allow and encourage industry to develop new means of control, such as process modifications, subject to certain restrictions. Until such time that process modifications can be shown to be an effective means of continuous emission reduction able to achieve the limitations imposed by these standards, industry has at its disposal on an individual basis, and subject to the terms of Section 111(j), a means for developing and perfecting these methods of control.

A commenter suggested that EPA, in promulgating the standards as proposed, will not allow industry to choose its method of compliance from a wide range of methods available to it. The proposed standards of performance were based on the criteria set forth in Section 111 of the Clean Air Act for the best continuous method of emission reduction, considering impacts, which have been adequately demonstrated. The promulgated standards are based on emission limitations that are achievable and are not meant to exclude any one method of control. Many forms of control have been investigated in the development of these standards. However, not all forms of control are capable of achieving the degree of control necessary to comply with the standards. This is not to say that methods of control, not presently able to meet the standards, cannot be adapted to effectively control glass plant particulate emissions to the imposed limits.

Commenters suggested that a linearly related production rate mass standard is unfair to those furnaces operating at low production rates due to such things as non-production incidents and holidays. A related comment raised by several commenters suggested that the proposed standards would prove to be unfair to those furnaces operating at other than "normal" levels of production. Specifically of concern to these commenters was the inability of glass furnaces to achieve a zero emission rate at times when the production rate approaches zero. It was emphasized by the commenters that even when the production rate of a glass melting furnace is zero there would be associated emissions due to the maintenance of the molten glass at the proper temperature.

In an attempt to resolve this issue it was suggested by a commenter that a lowest level emission limit be set at either 227 g/hr or 454 g/hr. This commenter explained that, based on the industry-wide estimation that emission levels at zero production rate are roughly 20 percent of those at normal production rates, a lowest level emission limit would have to be incorporated in the standards in order for furnaces operating at the lower end of their operational ranges to be able to comply with the standards. Due to the concerns expressed by these commenters, the method for the calculation of the furnace emission rate was changed in order to correct for the fact that emissions are generated at zero production rate.

Correction factors were developed after reviewing comments on this issue. Only one commenter offered a solution to this issue. This commenter suggested that a lowest level emission limit be set at either 227 g/hr or 454 g/hr. In comparing these figures with the controlled emission rates using the 20 percent figure it was determined that a correction of 227 g/hr should be applied to the container, pressed and blown (soda-lime and lead), and pressed and blown (other-than borosilicate, soda-lime, and lead) glass categories and subcategories; and an adjustment of 454 g/hr should be applied to the pressed and blown (borosilicate), wool fiberglass, and flat glass categories and subcategory.

The mechanism for providing the correction factors is to subtract this predetermined amount (g/hr) from the particulate emission rate (g/hr) determined in the procedure using EPA's Method 5. That amount is consequently applied to the rate of glass production (kg/hr) which is ultimately used to determine the furnace emission rate (g/kg). By using these correction factors, the calculated furnace emission rate will approach zero as the production rate approaches zero, thereby making the standards slightly easier to achieve.

Although the standards will be slightly easier to achieve, the impacts of the standards will not be substantially affected. This correction factor should not lead to the design of control devices any less efficient than those considered

appropriately designed to achieve the standards. This is due to the fact that as the production rate increases from zero, the particulate emission increases and outweighs the zero production rate correction factors. Thus, emission reduction and cost impacts will not be substantially changed.

Several commenters also suggested that there be more specific categories provided in the standards so as to more accurately reflect the industry production categories. It was felt that the pollutant contributions and the ability to control the emissions from the melting of all the different types of glass could not be adequately represented by only four categories. In considering this comment, it was decided to retain the division of the glass manufacturing industry into four major categories; however, one of the categories (pressed and blown glass) was changed. Due to a reanalysis of source test results that substantiate industry's claims of uniqueness of the pressed and blown category, it was decided to divide this category into three subcategories: borosilicate; soda-lime and lead; and other-than borosilicate, soda-lime, and lead rather than the two proposed subcategories: soda-lime and other-than soda-lime.

The decision to regulate the glass manufacturing industry as four categories of production was made based on technological information—in particular, the potential for particulate emission control, as well as the desire for regulatory simplification, as mandated by Executive Order 12044. In assessing the entire glass manufacturing industry it was found that the affected facility, the glass melting furnace, varied technologically in principally four areas of production (container glass, pressed and blown glass, fiberglass, and flat glass). Therefore, four readily identifiable categories were selected that were unique based on technological information and did not complicate the regulation. In the process of selecting the major categories of glass production it was found that the pressed and blown glass category had within itself areas of production that were individually unique as to their potential for particulate emission control. However, such individually unique areas were not found for the other categories. As a result, only the pressed and blown category was further divided into three subcategories: borosilicate; soda-lime and lead; and other-than borosilicate, soda-lime, and lead.

The decision to subdivide the pressed and blown glass category into three subcategories was based on test data and information gathered throughout the development of these standards. In studying the data and information it was found that emissions from the melting of borosilicate-type glass were uniformly the most difficult to control, while emissions from the melting of soda-lime and lead glass could be controlled to a greater extent. With these two extremes in potential for particulate emission control, the balance of the pressed and blown glass formulations (othern-than borosilicate, soda-lime, and lead) were found to be controlled, at least, at a relatively median level of control.

It was not practically possible to test glass manufacturing plants melting all types of batch formulations. The Standard Industrial Classification Manual lists in excess of 80 final glass products. Each of these glass products is liable to have several glass formulations depending upon the final use of the product, the color of the final product, or the manufacturer of the product. Despite the numerous formulations utilized throughout the industry it was found after a review of information received that the four major categories and the three subcategories for pressed and blown glass selected for these standards will adequately represent the emission reduction levels achievable for the melting of all glass formulations. There is ample reason to believe that any glass melting furnace will be able to comply with the appropriate regulatory limitation. The standards represent levels of control achievable by glass manufacturers.

In response to comments submitted by industry, the Administrator has reevaluated all of the proposed standards of performance. In performing these analyses, it was determined that some of the standards required adjustment to truly reflect the industry's ability to achieve the standards.

The promulgated container glass category emission limitation remains the same as that proposed (0.1 g/kg). The pressed and blown category, as previously discussed, was split into three subcategories, rather than the two subcategories that were in the proposed standards. The proposed numerical limitations (0.1 g/kg for soda-lime and 0.25 g/kg for other-than soda-lime) have been changed to reflect the ability of the particulate emissions from this category to be controlled. Borosilicate glass furnaces, which were included in the proposed other-than soda-lime subcategory have a standard applicable solely to borosilicate glass furnaces (0.5 g/kg); soda-lime glass furnaces have the same limitation (0.1 g/kg); lead glass furnaces, which were included in the proposed other-than soda-lime subcategory, are required to comply with the proposed soda-lime limitation (0.1 g/kg); the balance of the glass melting furnaces that produce pressed and blown glass are grouped in the other-than borosilicate, soda-lime, and lead glass subcategory and are required to meet a standard of 0.25 g/kg. The proposed wool fiberglass category emission limitation was changed from 0.2 g/kg to a promulgated limitation of 0.25 g/kg. The proposed flat glass category emission limitation was changed from 0.15 g/kg to a promulgated limitation of 0.225 g/kg.

One commenter suggested that the numerical emission limits imposed by the standards of performance invite borderline compliance status in all of the four major categories of glass manufacturing plants. This commenter's opinion was that this sort of practice, not providing a sufficient regulatory cushion to operate within, does not follow in the intended spirit of the development of these standards.

These standards of performance are based on test results conducted in accordance with EPA Method 5 and the Los Angles Air Pollution Control District (LAAPCD) method, as discussed in the preamble to the proposed standards. Upon reviewing old and recently submitted data, some of the standards were changed to more accurately reflect the emission control abilities of the four categories of glass products. The promulgated standards reflect for each individual category of glass manufacturing plant the degree of continuous emission reduction, which the Administrator had determined to be adequately demonstrated taking into consideration the costs, and nonair quality health and environmental, and energy impacts associated with their attainment. The standards are based on emission data and the exercise of good engineering judgment and do not invite borderline compliance, as suggested by the commenter.

Several commenters complained that the standards applicable to their industry were incorrectly based on technology transfer. These commenters suggested that technical differences in the manufacture of their types of glass make it more difficult to control their emissions as opposed to the generalized categories investigated in the Background Information Document, Volume I.

The differences suggested by the commenters would only be important if the achievability of the standards were in question. However, data collected from plants in all of the categories clearly demonstrate the achievability of

the standards. After reviewing those data and considering the factors relevant to achieving compliance, the Administrator has concluded that the standards are achievable for all types of glass manufacturing plants. This is not to say that the use of technology transfer is not justified in certain circumstances. On the contrary, technology transfer as a means of setting standards is an appropriate method upon which to base limitations such as these.

The standards were generally based on tests conducted on glass manufacturing plants firing natural gas. In order to take into account the difference in emission contribution of the two fuels used in glass melting (natural gas and fuel oil) an additional increment has been allowed for those glass melting furnaces firing fuel oil. As a result of comments received and an analysis of submitted data the allowance for fuel oil firing was increased from the proposed amount of 15 percent to 30 percent. The increment will be available to all glass melting furnaces, except flat glass melting furnaces. The flat glass standard was based solely on tests conducted at an oil-fired flat glass plant.

Modification, Reconstruction, and Other Considerations

The major comments submitted for this area of consideration dealt with the rebricking, fuel conversion, all-electric melter, and small glass furnace exemptions from the limitations provided for in the proposed standards. Almost all of the comments received supported the granting of these exemptions as being vital to the future development of the glass manufacturing industry. Based on the analyses performed in response to comments received relative to these exemptions, it was decided to retain them and add one more. The rebricking exemption was not questioned due to the regularity and necessity of this operation in this industry.

The all-electric melter exemption was retained despite comments suggesting that the secondary particulate emissions associated with the generation of the additional electricity would more than negate the benefits of the reduced particulate emissions from these furnaces.

It should be noted that this estimate was based on the mistaken assumption that all affected glass melting furnaces will utilize electric power as their sole source of heat. It is generally known throughout the industry that this will not be the case due to the inherent constraints realized by the use of electric power. Presently, only a fraction of the container, pressed and blown, and wool fiberglass industries can employ all-electric furnaces.

These secondary particulate emissions were addressed in the Background Information Document, Volume I, in Chapter 7. On page 7–19 of that document, the annual secondary impact associated with these standards was estimated to range from approximately 9,300 kg to 25,000 kg. The commenter estimated the secondary impact to be approximately 50,000 tons of particulate emissions per year.

Using EPA's AP–42 Document for uncontrolled coal-fired utility boilers as a basis for calculating secondary particulate emissions, the emissions from new all-electric melters result in an emission reduction of approximately 37 percent, compared to an uncontrolled glass melting furnace. However, as of 1971 new coal-fired utility boilers have had to comply with a new source performance standard. Using that standard as a basis for calculating secondary impacts, an 82 percent emission reduction will be realized. Additionally, using the latest standard to be promulgated for coal-fired power plants (1979) as a basis for calculating secondary impacts, an 87 percent reduction in emissions will be realized. Thus, the use of all-electric melters rather than conventional glass melting furnaces results, generally, in an emission reduction. Based on an annual estimated impact and the benefits expected to accrue from the use of all-electric melters, the all-electric melter exemption was retained.

The only exemption to be modified was the proposed provision exempting small glass melting furnaces, i.e., designed to produce a maximum of 1.82 megagrams of glass per day, from compliance with the standards. This exemption was expanded to include glass melting furnaces designed to produce up to 4.55 megagrams of glass per day. It was found that this size furnace more nearly represents the production limit beyond which continuous melting furnaces are generally operated.

This exemption was limited to the 4.55 megagrams per day production rate despite a comment received suggesting an exemption for hand glass melting furnaces as large as 13.65 megagrams per day. This decision was based on an analysis in the initial development of these standards including glass melting furnaces with design production rates ranging from 13.65 to 18.2 megagrams per day. It was concluded, as a result of the initial economic analysis, that furnaces with design production rates within the aforementioned range as well as above it are continuous melting furnaces capable technologically and economically of meeting the limitations presented in the standards.

All hand glass melting furnaces, however, were exempted from compliance with the standards. This decision was based on a further analysis of the industry, as suggested by commenters, who claimed that the industry would not survive the cost of this regulation. As indicated in the preamble to the proposed standards, these types of furnaces would not likely survive the associated economic impacts. Thus, hand glass melting furnaces have been exempted from compliance with these standards of performance.

General Issues

Several commenters felt that the State Implementation Plan (SIP) used as a baseline from which to compare the impacts of the proposed standards was not typical for the industry and was arbitrarily selected. It was industry's position that by using the SIP selected, the projected environmental, energy, and economic impacts of the proposed standards were not accurately represented.

The selection of the baseline was based on several factors. Not only was the overall restrictiveness of the State standards compared, but also the relative share of the industry in each of the States was considered. After performing an analysis prior to the proposal of these standards, it was concluded that the baseline used in the development of the proposed standards could be considered typical for the industry. After reviewing comments on this issue and the analysis performed, the baseline is still considered typical for this industry.

There were also suggestions that the standards be concentration standards rather than mass standards. These suggestions were made based on the smaller amount of data that would be required to determine a furnace's compliance with concentration standards as opposed to mass standards.

Concentration standards would penalize energy-efficient furnaces because a decrease in the amount of fuel required to melt glass decreases the volume of gases released but not the quantity of particulate matter emitted. As a result, the concentration of particulate matter in the exhaust gas stream would be increased even though the total mass emitted remained the same. Even if a concentration standard were corrected to a specified oxygen

content in the gas stream, this penalizing effect of the concentration standard would not be overcome.

Therefore, even though concentration standards involve lower resource requirements for testing than mass standards, mass standards are more suitable for the regulation of particulate emissions from glass melting furnaces because of their flexibility to accommodate process improvements and their direct relationship to the quantity of particulate emitted to the atmosphere. These advantages outweigh the drawbacks associated with creating and manipulating a data base. Consequently, mass standards are selected as the format for expressing standards of performance for glass melting furnaces.

Various commenters stated that the uncontrolled emission rates used to compare the emission reductions attributable to the standards for container glass, flat glass, and wool fiberglass were inaccurate. It was suggested that the uncontrolled emission rate for container glass should be changed from 1.25 g/kg to about 0.5 g/kg; the uncontrolled emission rate for flat glass should be changed from 1.5 g/kg to about 0.5 g/kg; and the uncontrolled emission rate for wool fiberglass should be changed from 5 g/kg to from 11 to 15 g/kg.

An analysis of these comments and additional test reports was made. It was determined that the uncontrolled emission rates for the container and flat glass categories would be more accurately represented by the rates 0.75 g/kg and 1.0 g/kg, respectively; however, the uncontrolled emission rate used for wool fiberglass category was found to be representative. The impacts of these changes are reflected in the Environmental, Economic, and Energy Impact sections of this preamble.

Environmental Impact

A few commenters questioned the ability of the industry to effectively recycle collected particulate and product waste. The preamble to the proposal stated that the particulate dusts can generally be recycled, or they can be landfilled if recycling proves to be unattractive.

Depending on the category of glass being produced, collected particulate may be recycled as a raw material. Some glasses, such as flat glass, require that the batch formulation not contain certain contaminants, but others are not as critical as flat glass. These other glasses are able to tolerate additional elements, such as alumina, contained in the furnaces' checkerworks, that are introduced into the exhaust stream.

In developing the impacts of these standards it was assumed that all affected facilities will landfill their collected particulate. However, this environmental impact will not be significant, whether the collected particulate is landfilled or recycled. Thus, the comment does not question the impact of the standard.

Another issue raised questioned the landfilling of the collected particulate. It was suggested that the landfilling of these particulates, particularly those collected from the production of glass where fluoride, boron, and lead are present in the batch formulations, may endanger the public health or welfare.

There is no indication that landfilling, the commonly practiced method of solid waste disposal in this industry, will create such a problem. As landfill operations are subject to state regulation and possibly the Resource Conservation and Recovery Act (42 U.S.C. §§ 6901, *et seq.*) and the particulates collected as a result of the promulgation of these standards do not differ chemically from the material collected under a typical SIP regulation, there is minimal adverse impact on the environment. Therefore, current practices in landfilling are expected to continue throughout the industry and the waste impact of these standards is considered to be minimal.

The Environmental Impact portion of the Summary of Environmental, Energy, and Economic Impacts section of this preamble details the estimated impacts resulting from the promulgation of these standards.

Economic Impact

Several commenters were of the opinion that the cost effectiveness of the standards should prevent the standards from being promulgated. They contended that standards should not be based on add-on controls because the cost-effectiveness is unreasonable and the cost of removing the particulate exceeds the benefits derived from its removal.

The cost and benefit to public health and welfare associated with the reduction of air pollutant emissions is difficult, if not impossible, to quantify. In general, it is much easier to quantify the cost of an emission reduction than to quantify its benefit even though recent studies have shown substantial benefits from the reduction of air pollution. Thus, the cost is usually the subject of much discussion whereas the benefit is not. Given the inability to quantify both the cost and the benefit, it is not possible to determine whether the cost of control exceeds the benefits associated with control. Thus, the Administrator considers it inappropriate to make a regulatory decision based on a cost-benefit analysis.

Cost-effectiveness calculations are certainly useful in regulatory analyses for choosing among competing regulatory alternatives which achieve the same level of control. On the other hand, cost-effectiveness has too many limitations to be used as the major decision-making factor in setting standards of performance under Section 111. It is not practical to identify a numerical criterion which represents an upper limit in cost per unit of pollutant removed. Technological differences among industries cause control costs for any given pollutant to vary considerably. In the case of glass manufacturing, this is illustrated by the fact that among several segments there are considerable differences in cost per unit pollutant removed. There are also segments where little difference in costs between SIPs and NSPS is evident, while in other segments there are distinct differences. Third, the economic impact analysis employed in this instance used the most costly controls to determine worst-case effects. The other less costly alternatives that achieve equivalent control levels are also available to the source. In reaching the conclusion that the promulgated standards would have no significant economic impact on the glass manufacturing industry, other factors besides cost-effectiveness, were taken into consideration. The costs associated with the achievement of these promulgated standards were considered in the context of the cost structure of the industry by means of an economic analysis including, where necessary, a discounted cash flow model. Upon considering these factors, the economic impacts of the proposed standards were determined to be reasonable. These impacts are still considered reasonable for the promulgated standards of performance.

The Economic Impact portion of the Summary of Environmental, Energy, and Economic Impacts section of this preamble details the average percent price increase, the cumulative capital costs, and the annualized costs associated with the promulgation of these standards.

Commenters claimed that the cost of particulate control should be totally attributed to the standards of performance. The cost of the standards of performance are analyzed based on the assumption that SIP regulations require control where uncontrolled emissions are greater than SIP allowed emissions. As discussed in the General

Issues section of this preamble, a SIP typical of what glass manufacturing plants have been required to comply with was chosen. This SIP requires, in most cases, emission reduction through add-on control technology. It would be unrealistic not to delete the cost that a new plant would incur without the establishment of standards of performance. Therefore, it is realistic to estimate the added or incremental cost that would be incurred if a standard of performance control level greater than that required by SIP is established. In addition, the emission reduction attributed to the standards of performance is that attributable to the standards after SIP regulations have been applied.

These commenters argued that uncontrolled emission rates and SIP regulations do not necessitate the use of add-on controls as indicated in the economic analysis. However, typical glass melting furnaces, with the exception of the 50 tons/day pressed and blown glass furnaces, require add-on controls. This conclusion is supported by the fact that many glass melting furnaces have been required, and are still required, to install add-on controls.

It was also suggested by a commenter that the Administrator should not analyze the effect of the standards on a number of new plants constructed in a specified time period by simply estimating a rate of return expected from a typical plant, under price and cost assumptions like the ones used in the Background Information Document, Volume I.

Regulatory impact analyses using typical or model plant parameters are by far the most prevalent techniques in all economic impact studies involving new source performance standards (and other regulations) performed by or for EPA, and are widely accepted by various industrial segments previously affected by EPA regulations. Model plant analysis is the only technique which reasonably addresses regulatory impact on projected new plants which typically face financial parameters, including costs, which are different from those faced by existing plants.

It was alleged by a commenter that certain erroneous tax assumptions were made in the calculation of the economic impacts associated with these standards. It was additionally alleged that when corrected, these assumptions resulted in figures showing that new container glass plants subject to the standards would not profitably repay the original investment necessary to build them.

In the development of the economic impacts in the BID, Volume I, interest was treated as a deduction, not a tax credit. It was deducted as an expense in computing profits in the discounted flow analyses and then added back to cash flow. The reason for the add-back is to avoid the double counting of interest since the discount rate includes a cost of money and interest had been deducted as an expense.

There was, however, a mistake in the treatment of the investment tax credit. It was incorrectly used in full in the first year calculation of the discounted cash flow. As a result, the net present value of the tax credit is less than it could have been if used fully in the first year. The resultant correction of the discounted cash flow amount is 0.1 percent. This 0.1 percent change in the discounted cash flow would not affect the conclusion that the economic impact on a new container glass plant is reasonable.

It was also commented that small firms and competition from substitute products had not been adequately taken into consideration in developing these standards.

Analyses were made of small glass manufacturing plants. The size of these plants were selected after reviewing information submitted by the glass manufacturing industry before the proposal of these standards. These analyses led the Administrator to exempt small tanks, i.e., glass melting furnaces designed to produce 4.55 megagrams of glass per day or less, from the standards. Tanks designed to produce 4.55 megagrams or less of glass per day are non-continuous tanks, and non-continuous tanks cannot afford the cost of the standards.

Small firms generally operate small plants that are typically deprived of economies of scale that are available to large plants. Therefore, an analysis of small plants tends to state the costs faced by the industry more conservatively than would have been the case had a larger-sized plant been used in the analyses. Thus, small firms were, in part, considered in the development of these standards.

Competition from substitute products was also taken into account. Part of the economic analysis included a case with an assumption that there would be no price increase. In this case the product's current competitive position relative to substitute products would be unaffected by the establishment of these standards. The conclusion of this part of the economic analysis indicated that the cost of the standards would not adversely affect the decision to construct a new glass melting furnace based on the minimum rate of return for those categories with highly competitive positions.

Energy Impact

One commenter suggested that one of the benefits of implementing process modifications is the conservation of energy. Although this may be true in certain instances, the Administrator has determined that this technique is not adequately demonstrated and cannot presently be the basis upon which these standards are promulgated. However, the application of process modifications should not conflict with the achievement of the standards, thereby facilitating the possible energy conservation benefits attributable to process modifications.

A detailed energy analysis was performed for inclusion in the development of the BID, Volume I. That analysis took into account all of the known adequately demonstrated effective methods of continuous emission control for the glass manufacturing industry. The evaluation yielded results that showed that the energy consumption attributable to the attainment of these standards of performance is reasonable.

The Energy Impact portion of the Summary of Environmental, Energy, and Economic Impacts section of this preamble details the percent of the new plants' total energy consumption that will be attributable to both the SIPs and the standards as well as the total energy consumption beyond SIP that will be attributable to the standards.

Although it may be true that for some forms of process modifications the energy required to melt the glass may remain unchanged, other methods will increase the energy consumption of a glass manufacturing plant. This point was made by several commenters especially with respect to the use of electric boosting.

Test Methods and Monitoring

Some commenters stated that EPA Method 5, "Determination of Particulate Emissions from Stationary Sources" contains several sources of error when used to sample emissions from soda-lime glass melting furnaces. They stated that misclassification of particulate and gaseous species and inflated particulate emission values are errors which can be caused by the use of filter temperatures below the sulfur trioxide (SO_3) dew point.

When particulate matter is filtered at about 120°C, a significant amount of sulfuric acid, if present, can condense on the filter. The measurement of this sulfuric acid by Method 5 does not constitute an error in the method

because sulfuric acid is normally considered to be particulate matter. However, the variability of the sulfuric acid content in the stack gas was not considered in developing the standards. As a result, the decision was made not to include sulfuric acid as part of these standards. Therefore, the method was modified to allow operation of the filter and the probe at up to 177°C, which is above the acid dew point and would prevent sulfuric acid mist from being collected by the filter.

Commenters remarked that sulfur dioxide (SO_2) and sulfur trioxide (SO_3) can react with the alkali in the Method 5 filter and cause higher than true particulate emission values.

An EPA report indicates that SO_2 and SO_3 react with some glass fiber filters, resulting in a significant weight gain in certain applications. The report also shows that this potential weight gain can be avoided by choosing a source of filter material demonstrated to be nonreactive to SO_2 and SO_3. The degree to which this reaction occurs is apparently related to the final rinse step of filter production which varies according to the supplier. In addition, this weight gain is not significant when SO_2 or SO_3 is not present in the sampled gas stream. Therefore, EPA is revising Method 5 to require the use of nonreactive filters in testing sources whose gas streams contain SO_2 or SO_3.

Commenters also suggested that the test method should allow a smaller minimum sample volume. This minimum sample requirement was modified to allow the option of lower sampling volumes, provided that a minimum of 50 milligrams of sample is collected. This was done to allow shorter sampling times for those plants which have higher particulate concentrations to collect an adequate amount of particulate to weigh, but still requires plants with low particulate concentration to sample long enough to collect an adequate amount of particulate to weigh.

Clarifications

Commenters expressed concern with the possible confusion of whether an entire glass manufacturing plant might be considered to be an affected facility if one of its glass melting furnace was to be modified or reconstructed and, thereby, subject itself as well as the entire plant to these new source performance standards. This confusion was remedied by redrafting the description of the affected facility.

Also suggested by a commenter was a provision to specifically exclude the float bath used in the flat glass category from being regulated as a part of the glass melting furnact (affected facility). The float bath is considered to be part of the forming process, not the melting process, and is, therefore, not regulated by these new source performance standards. To remedy this possible area of confusion, the regulation has been rewritten, as suggested.

The term "glass manufacturing plant" was removed from Section 60.291, Definitions, of the regulation as it was not needed.

The recipe definitions were also changed where appropriate to describe the specialized batch formulations found in the pressed and blown glass category. Detailed recipes for borosilicate, soda-lime and lead, and other than borosilicate, soda-lime, and lead were included in Section 60.291, Definitions, of the regulation.

Docket

The docket is an organized and complete file of all the information considered by EPA in the development of the rulemaking. The docket is a dynamic file, since material is added throughout the rulemaking development. The docketing system is intended to allow members of the public and industries involved to readily identify and locate documents so that they can intelligently and effectively participate in the rulemaking process. Along with the statement of basis and purpose of the promulgated standards and EPA responses to significant comments, the contents of the docket will serve as the record in case of judicial review [Section 307(d)(a)].

Miscellaneous

The effective date of these standards is the date of promulgation. Section 111(b)(1)(B) of the Clean Air Act provides that standards of performance or revisions thereof become effective upon promulgation and apply to affected facilities, construction or modification of which was commenced after the date of proposal, June 15, 1979, in this case.

As prescribed by Section 111 of the Act, the promulgation of these standards has been preceded by the Administrator's determination that emissions from glass manufacturing plants contribute to the endangerment of public health or welfare (36 FR 5931) and by the publication of this determination in the June 14, 1979, issue of the **Federal Register** (44 FR 34193). In accordance with Section 117 of the Act, publication of these promulgated standards was preceded by consultation with appropriate advisory committees, independent experts, and Federal departments and agencies.

It should be noted that standards of performance for new sources established under Section 111 of the Clean Air Act reflect:

> . . . application of the best technological system of continuous emission reduction which (taking into consideration the cost of achieving such emission reduction, any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated. [Section 111(a)(1)].

Although there may be emission control technology available that can reduce emissions below those levels required to comply with the standards of performance, this technology might not be selected as the basis of standards of performance due to costs associated with its use. Accordingly, these standards of performance should not be viewed as the ultimate in achievable emissions control. In fact, the Act requires (or has the potential for requiring) the imposition of a more stringent emission standard in several situations.

For example, applicable costs do not necessarily play as prominent a role in determining the "lowest achievable emission rate" for new or modified sources locating in nonattainment areas; i.e., those areas where statutorily-mandated health and welfare standards are being violated. In this respect, Section 173 of the Act requires that new or modified sources constructed in an area which is in violation of the NAAQS must reduce emissions to the level which reflects the "lowest achievable emission rate" (LAER), as defined in Section 171(3), for such category of source. The statute defines LAER as that rate of emissions based on the following, whichever is more stringent:

> (A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable; or
>
> (B) the most stringent emission limitation which is achieved in practice by such class or category of source.

In no event can the emission rate exceed any applicable new source performance standard [Section 171(3)].

A similar situation may arise under the prevention of significant deterioration of air quality provisions of the Act (Part C). These provisions require that certain sources [referred to in Section 169(1)] employ "best available control technology" [as defined in Section 169(3)] for all pollutants regulated under the Act. Best available control technology (BACT) must be determined on a case-by-case basis, taking energy, environmental, and economic impacts and other costs into account. In no event may the application

of BACT result in emissions of any pollutants which will exceed the emissions allowed by an applicable standard established pursuant to Section 111 (or 112) of the Act.

In all events, SIPs approved or promulgated under Section 110 of the Act must provide for the attainment and maintenance of national ambient air quality standards (NAAQS) designed to protect public health and welfare. For this purpose, SIPs must in some cases require greater emission reductions than those required by standards of performance for new sources.

Finally, States are free under Section 116 of the Act to establish even more stringent limits than those established under Section 111 or those necessary to attain or maintain the NAAQS under Section 110. Accordingly, new sources may in some cases be subject to limitations more stringent than EPA's standards of performance under Section 111, and prospective owners and operators of new sources should be aware of this possibility in planning for such facilities.

This regulation will be reviewed four years from the date of promulgation as required by the Clean Air Act. This review will include an assessment of such factors as the need for integration with other programs, the existence of alternative methods, enforceability, improvements in emission control technology, and reporting requirements. The need for reporting requirements in this regulation will be reviewed as required under EPA's sunset policy for reporting requirements in regulations.

Section 317 of the Clean Air Act requires the Administrator to prepare an economic impact assessment for any new source standard of performance promulgated under Section 111(b) of the Act. An economic impact assessment was prepared for this regulation and for other regulatory alternatives. All aspects of the assessment were considered in the formulation of the standards to insure that the standards would represent the best system of emission reduction considering costs. The economic impact assessment is included in the Background Information Document, Volume I.

Dated: October 1, 1980.

Douglas M. Costle,

Administrator.

40 CFR Part 60 is amended as follows:

1. By adding Subpart CC as follows:

Subpart CC—Standards of Performance for Glass Manufacturing Plants

Sec.

60.290 Applicability and designation of affected facility.
60.291 Definitions.
60.292 Standards for particulate matter.
60.293–60.295 [Reserved]
60.296 Test methods and procedures.

Authority: Sects. 111 and 301(a). Clean Air Act, as amended, [42 U.S.C. 7411, 7601(a)], and additional authority as noted below.

Subpart CC—Standards of Performance for Glass Manufacturing Plants

§ 60.290 Applicability and designation of affected facility.

(a) Each glass melting furnace is an affected facility to which the provisions of this subpart apply.

(b) Any facility under paragraph (a) of this section that commences construction or modification after June 15, 1979, is subject to the requirements of this subpart.

(c) This subpart does not apply to hand glass melting furnaces, glass melting furnaces designed to produce less than 4,550 kilograms of glass per day and all-electric melters.

§ 60.291 Definitions.

As used in this subpart, all terms not defined herein shall have the meaning given them in the Act and in Subpart A of this part, unless otherwise required by the context.

"All-electric melter" means a glass melting furnace in which all the heat required for melting is provided by electric current from electrodes submerged in the molten glass, although some fossil fuel may be charged to the furnace as raw material only.

"Borosilicate Recipe" means raw material formulation of the following approximately weight proportions: 72 percent silica; 7 percent nepheline syenite; 13 percent anhydrous borax; 8 percent boric acid; and 0.1 percent misellaneous materials.

"Container glass" means glass made of soda-lime recipe, clear or colored, which is pressed and/or blown into bottles, jars, ampoules, and other products listed in Standard Industrial Classification 3221 (SIC 3221).

"Flat glass" means glass made of soda-lime recipe and produced into continuous flat sheets and other products listed in SIC 3211.

"Glass melting furnace" means a unit comprising a refractory vessel in which raw materials are charged, melted at high temperature, refined, and conditioned to produce molten glass. The unit includes foundations, superstructure and retaining walls, raw material charger systems, heat exchangers, melter cooling system, exhaust system, refractory brick work, fuel supply and electrical boosting equipment, integral control systems and instrumentation, and appendages for conditioning and distributing molten glass to forming apparatuses. The forming apparatuses, including the float bath used in flat glass manufacturing, are not considered part of the glass melting furnace.

"Glass produced" means the weight of the glass pulled from the glass melting furnace.

"Hand glass melting furnace" means a glass melting furnace where the molten glass is removed from the furnace by a glassworker using a blowpipe or a pontil.

"Lead recipe" means raw material formulation of the following approximate weight proportions: 56 percent silica; 8 percent potassium carbonate; and 36 percent red lead.

"Pressed and blown glass" means glass which is pressed, blown, or both, including textile fiberglass, noncontinuous flat glass, noncontainer glass, and other products listed in SIC 3229. It is separated into:

(1) Glass of borosilicate recipe.

(2) Glass of soda-lime and lead recipes.

(3) Glass of opal, fluoride, and other recipes.

"Rebricking" means cold replacement of damaged or worn refractory parts of the glass melting furnace. Rebricking includes replacement of the refractories comprising the bottom, sidewalls, or roof of the melting vessel; replacement of refractory work in the heat exchanger; replacment of refractory portions of the glass conditioning and distribution system.

"Soda-lime recipe" means raw material formulation of the following approximate weight proportions: 72 percent silica; 15 percent soda; 10 percent lime and magnesia; 2 percent alumina; and 1 percent miscellaneous materials (including sodium sulfate).

"Wool fiberglass" means fibrous glass of random texture, including fiberglass insulation, and other products listed in SIC 3296.

§ 60.292 Standards for particulate matter.

(a) On and after the date on which the performance test required to be conducted by § 60.8 is completed, no owner or operator of a glass melting furnace subject to the provisions of this subpart shall cause to be discharged into the atmosphere—

(1) From any glass melting furnace fired exclusively with either a gaseous fuel or a liquid fuel, particulate matter at emission rates exceeding those specified in Table CC–1, Column 2 and Column 3, respectively, or

(2) From any glass melting furnace, fired simultaneously with gaseous and liquid fuels, particulate matter at

emission rates exceeding STD as specified by the following equation:

STD=X [1.3(Y)+(Z)]

Where:

STD=Particulate matter emission limit, g of particulate/kg of glass produced.

X=Emission rate specified in Table CC-1 for furnaces fired with gaseous fuel (Column 2).

Y=Decimal percent of liquid fuel heating value to total (gaseous and liquid) fuel heating value fired in the glass melting furnaces as determined in § 60.296(f). (joules/joules).

Z=(1-Y).

(b) Conversion of a glass melting furnace to the use of liquid fuel is not considered a modification for the purposes of § 60.14.

(c) Rebricking and the cost of rebricking is not considered a reconstruction for the purposes of § 60.15.

Table CC-11.—*Emission Rates*

[g of particulate/kg of glass produced]

Col. 1—Glass manufacturing plant industry segment	Col. 2—Furnace fired with gaseous fuel	Col. 3—Furnace fired with liquid fuel
Container glass	0.1	0.13
Pressed and blown glass		
(a) Borosilicate Recipes	0.5	0.65
(b) Soda-Lime and Lead Recipes	0.1	0.13
(c) Other-Than Borosilicate, Soda-Lime, and Lead Recipes (including opal, fluoride, and other recipes)	0.25	0.325
Wool fiberglass	0.25	0.325
Flat glass	0.225	0.225

§§ 60.293-60.295 [Reserved]

§ 60.296 Test methods and procedures.

(a) Reference methods in Appendix A of this part, except as provided under § 60.8(b), shall be used to determine compliance with § 60.292 as follows:

(1) Method 1 shall be used for sample and velocity traverses, and

(2) Method 2 shall be used to determine velocity and volumetric flow rate.

(3) Method 3 shall be used for gas analysis.

(4) Method 5 shall be used to determine the concentration of particulate matter and the associated moisture content.

(b) For Method 5, the probe and filter holder heating systen in the sampling train shall be set to provide a gas temperature no greater than 177° C. The sampling time for each run shall be at least 60 minutes and the collected particulate shall weigh at least 50 mg.

(c) The particulate emission rate, E, shall be computed as follows:

$$E=Q\times C$$

Where:

(1) E is the particulate emission rate (g/hr)

(2) Q is the average volumetric flow rate (dscm/hr) as found from Method 2

(3) C is the average concentration (g/dscm) of particulate matter as found from the modified Method 5

(d) The rate of glass produced, P (kg/hr), shall be determined by dividing the weight of glass pulled in kilograms (kg) from the affected facility during the performance test by the number of hours (hr) taken to perform the performance test. The glass pulled, in kilograms, shall be determined by direct measurement or computed from materials balance by good engineering practice.

(e) For the purposes of these standards the furnace emission rate shall be computed as follows:

$$R=E-A\div P$$

Where:

(1) R is the furnace emission rate (g/kg)

(2) E is the particulate emission rate (g/hr) from (c) above

(3) A is the zero production rate correction;
A is 227 g/hr for container glass, pressed and blown (soda-lime and lead) glass, and pressed and blown (other-than borosilicate, soda-lime, and lead) glass
A is 454 g/hr for pressed and blown (borosilicate) glass, wool fiberglass, and flat glass

(4) P is the rate of glass production (kg/hr) from (d) above

(f) When gaseous and liquid fuels are fired simultaneously in a glass melting furnace, the heat input of each fuel, expressed in joules, is determined during each testing period by multiplying the gross calorific value of each fuel fired (in joules/kilogram) by the rate of each fuel fired (in kilograms/second) to the glass melting furnaces. The decimal percent of liquid fuel heating value to total fuel heating value is determined by dividing the heat input of the liquid fuels by the sum of the heat input for the liquid fuels and the gaseous fuels. Gross calorific values are determined in accordance with American Society of Testing and Materials (A.S.T.M.) Method D 240-64(73) (liquid fuels) and D 1826-64(7) (gaseous fuels), as applicable. The owner or operator shall determine the rate of fuels burned during each testing period by suitable methods and shall confirm the rate by a material balance over the glass melting system. [Section 114 of Clean Air Act, as amended (42 U.S.C. 7414).]

2. By adding a second paragraph in Section 3.1.1 of Reference Method 5 of Appendix A, as follows:

Appendix A—Reference Methods

* * * * *

Method 5—Determination of Particulate Emissions From Stationary Sources

* * * * *

3.1.1 Filters. * * *

In sources containing SO_3 or SO_2, the filter material must be of a type that is unreactive to SO_3 or SO_2. Citation 10 in Section 7 may be used to select the appropriate filter.

* * * * *

[Section 114 of Clean Air Act, as amended (42 U.S.C. 7414)]

Appendix A [Amended]

3. By adding Citation 10 at the end of Section 7 of Reference Method 5 of Appendix A, as follows:

* * * * *

Method 5—Determination of Particulate Emissions From Stationary Sources

* * * * *

7. Bibliography. * * *

10. Felix, L. G., G. I. Clinard, G. E. Lacey, and J. D. McCain. Inertial Cascade Impactor Substrate Media for Flue Gas Sampling. U.S. Environmental Protection Agency. Research Triangle Park, N.C. 27711, Publication No. EPA-600/7-77-060. June 1977. 83 p.

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[Section 114 of Clean Air Act, as amended (42 U.S.C. 7414)]

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